PATENT SPECIFICATION

591,730

Application Date: May 11, 1945. No. 11832/45.

Complete Specification Left: March 27, 1946.

Complete Specification Accepted: Aug. 27, 1947.

PROVISIONAL SPECIFICATION

Improvements in Anti-Vibration Mountings of the Co-axial Bush Type

We, DUNLOP RUBBER COMPANY LIMITED, of 1, Albany Street, London, N.W.1, a Company Incorporated under the Laws of Great Britain, and THOMAS EDWARD HORACE GRAY and WILLIAM ARTHUR GURNEY, both of the Company's Works at Fort Dunlop, Erdington, Birmingham, 24, and both British Subjects, do hereby declare the nature of this invention to be as follows:—

This invention has reference to improvements in anti-vibration mountings of the co-axial bush type.

Co-axial anti-vibration mountings of the co-axial bush type as constructed heretofore are subject to the disadvantage that a mounting is more resistant to radial displacement than to axial displacement, and the present invention has for its object to provide an improved anti-vibration mounting of the co-axial bush type in which there may be obtained any desired ratio of radial to axial stiffness.

According to the invention, an anti-vibration mounting of the co-axial bush type is characterised in that the inner and outer rigid bush members are connected by sets of arms of rubber or like resilient material which are arranged radially but which also are inclined in opposite directions relatively to the axis of the mounting.

According to the invention also an improved anti-vibration mounting of the co-axial bush type comprises rigid inner and outer bush members which are connected by sets of arms of rubber or like resilient material which are contained in radial planes but which are oppositely inclined relatively to the axis of the mounting and the ends of which are bonded or otherwise secured to the respective presented faces of the said members, said arms being distributed in a balanced manner radially and axially.

Moreover, according to the invention the resilient arms are arranged without overlap in an axial direction whereby the finished mounting can be produced by a single operation as hereinafter described.

In one embodiment of the invention as applied to a relatively long anti-vibration mounting the said mounting comprises rigid inner and outer members in the form of bushes which are arranged co-axially and which are connected by two equal sets of rubber arms which are contained in radial planes but which are oppositely inclined relatively to the axis of the mounting, the ends of the arms being bonded or otherwise secured to the respective presented surfaces of the inner and outer bushes. The rubber arms for example in the case where sixteen of such members are employed may be divided conveniently into four equal sets arranged so that alternate sets are inclined in opposite directions.

The arms are spaced equally and adjacent sets are spaced so that they can be regarded as assuming a spiral formation when viewing the assembly as a whole.

The arms are preferably of a rectangular shape in cross section, although if desired the sides may be inclined relatively to the tops and bottoms.

In order to enable the unit to be produced as a moulding the angular dimensions of the arms when seen in end view must not exceed 360°, so that there is no overlapping of the arms, thus enabling the unit to be produced by mould sections which are brought together axially and so permitting each exposed surface of each arm to be shaped or moulded from the ends without interference from any other arm.

A short and compact unit may be produced if desired by two sets of four arms which are oppositely inclined relatively to the axis of the bushes and which are arranged so that alternate arms connect opposite and alternate ends of the respective presented surfaces of the bushes.

Anti-vibration mountings may be constructed as hereinbefore described which possess resistances to both radial and axial displacement which are more nearly equal than in similar mountings as constructed heretofore, but at the same time it will be understood that if required the arrangement may be varied so as to enable any desired ratio of radial to axial stiffness to be obtained.

[Price 1/-] Price 4s 6d

Price 5s. 0d.

Price 7s.

Dated this 10th day of May, 1945.

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Birmingham, 3,
Agent for Applicants.

COMPLETE SPECIFICATION

Improvements in Anti-Vibration Mountings of the Co-axial Bush Type

We, DUNLOP RUBBER COMPANY LIMITED, of 1, Albany Street, London, N.W.1, a Company Incorporated under the Laws of Great Britain, and THOMAS EDWARD HORACE GRAY and WILLIAM ARTHUR GURNEY, both of the Company's Works at Fort Dunlop, Erdington, Birmingham, 24, and both British Subjects, do hereby declare the nature of this invention and in what manner the same is to be performed; to be particularly described and ascertained in and by the following statement:—

This invention has reference to improvements in anti-vibration mountings of the co-axial bush type.

Co-axial anti-vibration mountings of the co-axial bush type as constructed heretofore are subject to the disadvantage that a mounting is more resistant to radial displacement than to axial displacement, and the present invention has for its object to provide an improved anti-vibration mounting of the co-axial bush type in which there may be obtained any desired ratio of radial to axial stiffness.

According to the invention, an anti-vibration mounting of the co-axial bush type comprises an inner bush, an outer bush, and a plurality of radial arms of rubber or like resilient material bonded to the said inner and outer bushes, the said arms being inclined to the axis of the said bushes and symmetrically arranged around the said axis in sets, the arms of each set being in staggered relationship to the arms of the adjacent set, and the inclination to the said axis of the arms of one set being opposite to the inclination of the arms of the adjoining set.

Moreover according to the invention the resilient arms are arranged without overlap in an axial direction whereby the finished mounting can be produced by a single operation as hereinafter described.

The invention will now be described with particular reference to the accompanying drawings wherein:—

Figure 1 is a perspective view of a relatively long anti-vibration mounting constructed in accordance with the invention with part of the rigid outer casing removed for the sake of clearness.

Figure 2 is a diagrammatic end view of Figure 1 illustrating the disposition of the sets of resilient radially arranged arms.

Figure 3 is a vertical section of another embodiment of the invention and

Figure 4 is an end view of the mounting illustrated in Figure 3.

Referring first to the embodiment of the invention illustrated in Figures 1 and 2 the anti-vibration mounting illustrated in these Figures comprises rigid inner and outer members in the form of bushes 7 and 8 which are arranged co-axially and which are connected by four radially arranged sets of rubber arms, designated 9A, 9B, 9C and 9D respectively. Each set of arms 9A, 9B, 9C, 9D is composed of four inclined equidistantly spaced arms.

The set of arms 9A is oppositely inclined relatively to the set of arms 9B; likewise the set of arms 9C is in the same direction as the arms 9A but oppositely relatively to the set of arms 9D which in turn are inclined in the same direction as the set of arms 9B.

The arms of the adjacent sets are spaced so that they can be regarded as assuming a spiral formation when viewing the assembly as a whole.

The individual arms of the sets 9A, 9B, 9C and 9D may be rectangular in shape and either constant or variable in cross section along their length.

As is apparent from Figure 2 each of the arms is visible and there is no overlapping of the arms when they are viewed in an axial direction. With such a construction the mounting may be produced in a single operation by shaping a suitable rubber or other composition between mould sections which are brought together axially between the bushes to form arms of the required shape and inclination and then heating the assembly to vulcanise the composition and effect bonding of the arms to the bushes simultaneously.

In the embodiment illustrated in Figures 3 and 4 the inner and outer bushes 10 and 11 are interconnected by two sets of rubber arms 12A, 12B, which are oppositely inclined relatively to the axis of the bushes 10, 11, and which are arranged so that the arms of the sets 12A and 12B respectively connect opposite ends of the respective surfaces of the bushes 10 and 11.

Anti-vibration mountings may be constructed as hereinbefore described which possess resistances to radial and axial displacements which are more nearly equal than in similar mountings as constructed heretofore, but at the same time it will be understood that if required the arrangement may be varied so as to enable any desired ratio of radial to axial stiffness to be obtained.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. An anti-vibration mounting of the co-axial bush type which comprises an inner bush, an outer bush, and a plurality of radial arms of rubber or like resilient material bonded to the said inner and outer bushes, the said arms being inclined to the axis of the said bushes and symmetrically arranged around the said axis in sets, the arms of each set being in staggered relationship to the arms of the adjacent set, and the inclination to the said axis of the arms of one set being opposite to the inclination of the arms of the adjoining set.

2. An anti-vibration mounting according to the preceding claim in which the resilient arms are arranged without overlap and hence rendered capable of being produced by mould sections which are brought together axially.

3. An anti-vibration mounting of the co-axial bush type constructed, arranged and adapted for use substantially as herein described with reference to Figures 1 and 2 of the accompanying drawings.

4. An anti-vibration mounting of the co-axial bush type constructed, arranged and adapted for use substantially as herein described with reference to Figures 3 and 4 of the accompanying drawings.

Dated this 26th day of March, 1946.

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Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1947.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies, price 1s. 0d. each (inland) 1s. 1d. (abroad) may be obtained.

[This Drawing is a reproduction of the Original on a reduced scale.]

FIG.1.

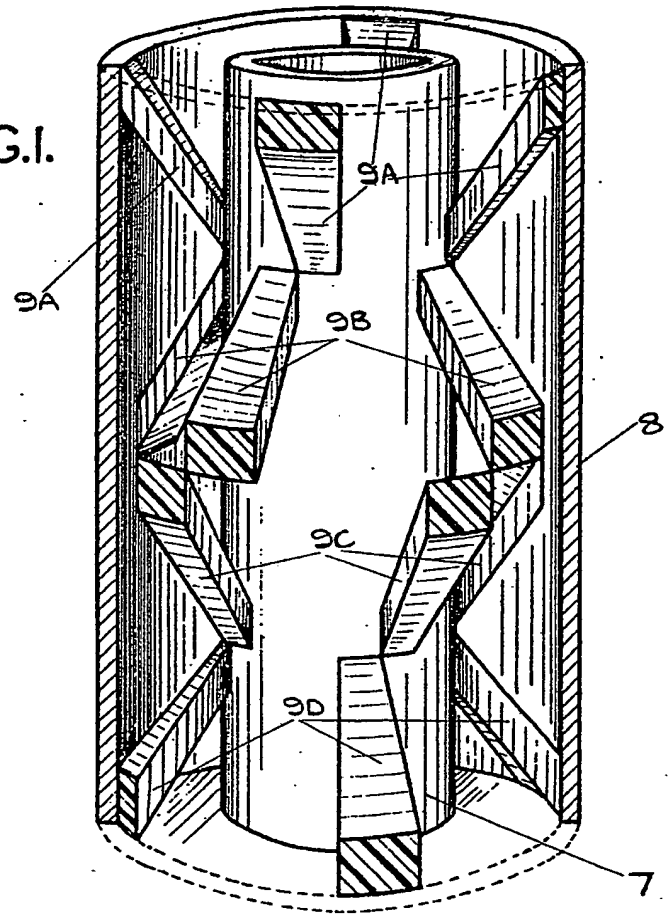


FIG.2.

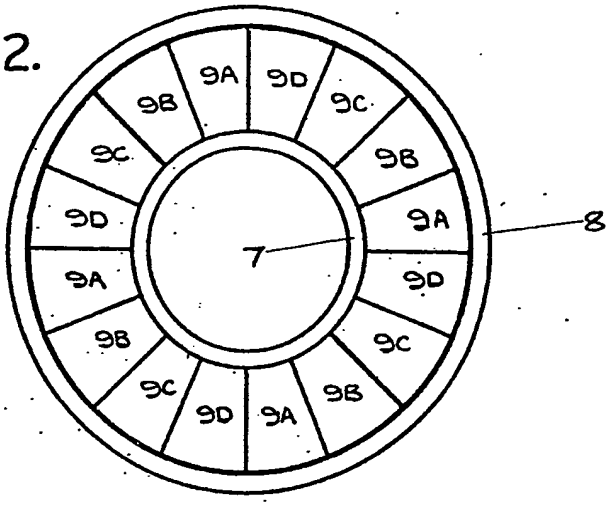


FIG.3.

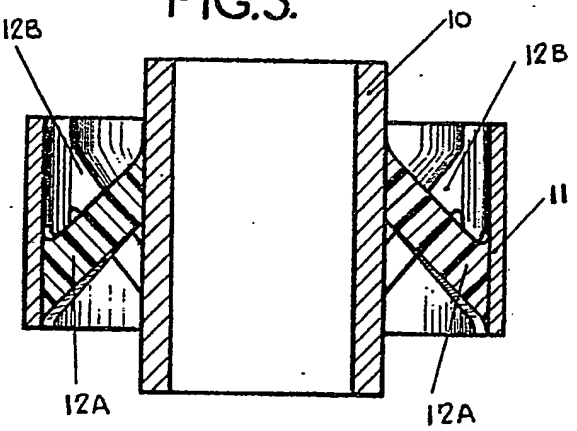


FIG.4.

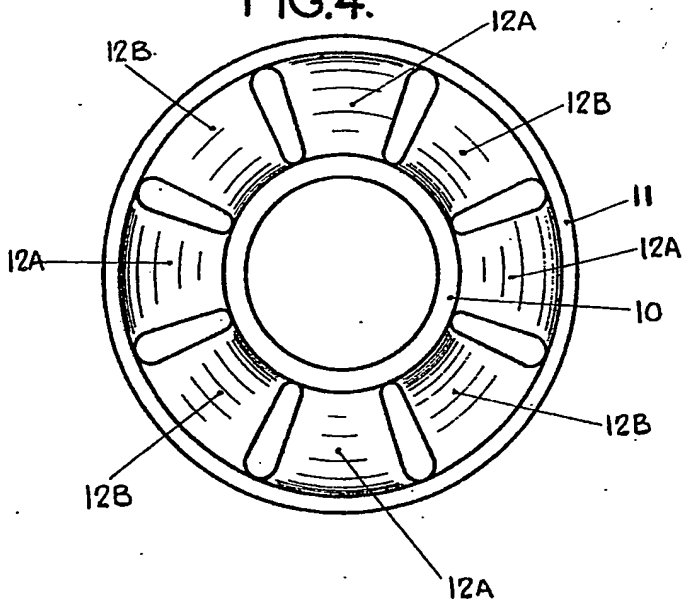


FIG.1.

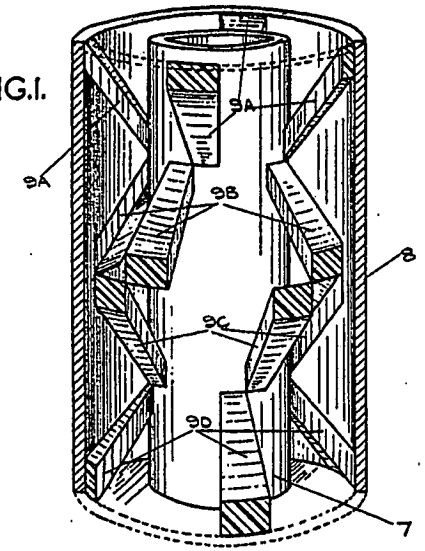


FIG.2.

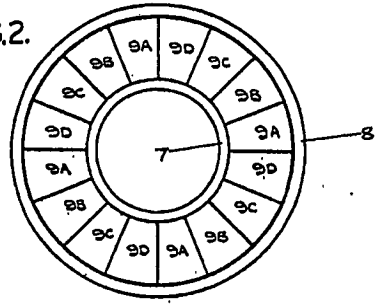


FIG.3.

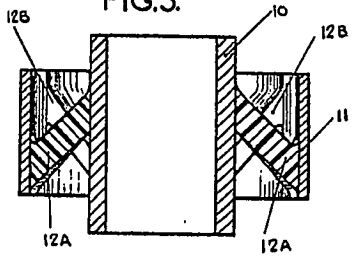
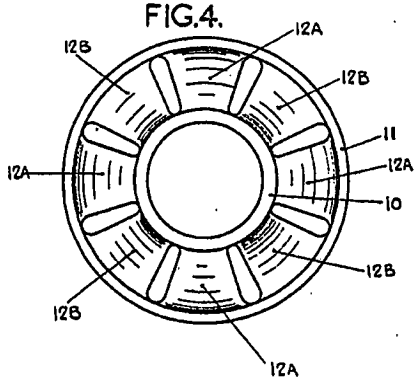


FIG.4.



H.M.S.O.(Ty. P.)